Preliminary Environment and Siting Report at SummitWind wind farm

Acronyms

COC	State and county committee
DOD	Department of Defense
FAA	Federal Aviation Administration
FSA	Farm Service Agency
KREWG	Kansas Renewable Energy Working Group
NWCC	National Wind Coordinating Committee
USFWS	US Fish and Wildlife Service

Introduction

Although wind power is considered "green energy," many concerns have been expressed about the effects of their presence on plants and animals native to South Dakota. These concerns are usually associated with siting and permitting of wind turbines. South Dakota's guidelines address activities and concerns associated with siting and permitting wind turbines. Successfully siting a wind power project often relies on trade-offs between community acceptability and economic viability, which relates to adequate communication.

Wind energy issues in South Dakota are similar to those in other states. Therefore, some issues and concerns were identified by other parties such as NWCC and the KREWG (see Acronyms above) Environmental and Siting Committee. Most guidelines were adapted from other states that have issues/concerns which are shared in South Dakota, but some guidelines are tailored to address the concerns and issues specifically to this state.

These guidelines address issues/concerns associated with the pre-construction, construction, or post-construction of wind turbines and have been divided into ten general categories:

1. Land Use
2. Natural and Biological Resources
3. Noise
4. Visual Resources
5. Public Interaction
6. Soil Erosion and/or Water Quality
7. Health and Safety
8. Cultural, Archaeological, and Paleontological Resources
9. Socioeconomic, Public Service, and Infrastructure
10. Solid and Hazardous Wastes
11. Air Quality and Climate
12. Grant and Roberts county planning and zoning requirements

The SummitWind wind farm project

The vision of the SummitWind project began in the Spring of 2006. Our first task was to set up a 20 meter anemometer outside of Summit, South Dakota. We held two informational meetings for our landowners in the Fall of 2006. At the end of these meetings, we had signed up close to 20,000 acres of potential properties for this project. The site is located south of Summit, South Dakota. It includes Osceola, Mazeppa, Farmington, Lura and Blooming Valley townships in Grant County, and Summit township in Roberts County. We plan to have a maximum capacity of 250 MW with approximately 100 turbines. Installation of turbines is estimated to begin in 2009.

In the summer of 2007, we plan to have a community meeting for the landowners as well as the nearby residents. The meeting is to inform them of our progress and what to look forward to in the next year.

Issues and Concerns

1. **Land Use**

   Aside from land uses such as agriculture, grazing, open space, habitat and land conservation, other land uses such as hunting/fishing, bird watching, wildlife photography etc. need to be considered when siting large wind projects in rural areas of South Dakota. We will contact appropriate experts and resource agencies to research and evaluate the issues prior to selecting specific site within the respective region.

   - Land use concerns are specific to different regions of South Dakota. Therefore early scoping and planning is crucial to reducing potentially incompatible uses.

   - Both wind and non-wind potential impacts (roads, transmission lines, substations) should be considered.

   - Develop a plan that avoids or minimizes land use conflicts. Design the project site layout to limit the use of the land, consolidate necessary infrastructure requirements wherever possible, and evaluate current transmission capacity and market access.

   In addition, rare and unique areas in South Dakota such as Coteau des Prairies should be given careful consideration, particularly in areas that are relatively unfragmented.

   - **Coteau des Prairies**

   Coteau des Prairies is one of the most unique physiographic regions in eastern South Dakota. The portion of the Coteau des Prairies in South Dakota measures 100 miles in its greatest width, 200 miles in length, and is composed of glacial sediments from numerous glaciations. These sediments reach a composite thickness of over 900 feet.

   Studies of the Coteau des Prairie provide data concerning the economic and natural resources in eastern South Dakota (i.e., ground water, sand and gravel, wetland areas, etc.). These studies are directed at refining the understanding of the glacial geology

of a large area of eastern South Dakota. This is important because a large number of aquifers used as sources of drinking water and for irrigation by South Dakota farmers are within the glacial sand and gravel deposits of the Coteau des Prairie. These deposits are also a source of coarse aggregate. Additionally, the sources of water for some of the wetlands on the Coteau des Prairie are aquifers within sand and gravel deposits that are present within this coteau. Currently, the Geological Survey is conducting aquifer delineation studies in the area of the Coteau des Prairie.

Special care should be given to avoid damage to unfragmented landscapes and high quality remnants in wetland and prairie ecosystems (e.g., tall grass, mixed grass, and short grass prairie). If possible, wind energy development should be located on already altered landscapes, such as cultivated or developed lands. An undeveloped buffer adjacent to intact prairies is also desirable.

2. Natural and Biological Resources

➢ Birds and Bats

According to NWCC, the ability of wind to generate electricity without many of the environmental impacts associated with other energy sources can significantly benefit birds, bats and many other plant and animal species. However, the direct and indirect local and cumulative impacts of wind plants on birds and bats continue to be an issue. The populations of many bird and bat species are experiencing long-term declines, due not only to the effects of energy use, but many other human activities.

Two types of local impacts to birds have been demonstrated at existing wind plants: 1) direct mortality from collisions, and 2) indirect impacts from avoidance, habitat disruption and displacement. Direct impacts to bats have also been documented at some wind plants.

i. Direct Mortality
- Birds (migrating and local, raptors) and bats sometimes collide with wind turbines, met towers or maintenance vehicles
- Most fatality estimates reported for wind projects are based on extrapolations of the number of fatalities with the estimates corrected for observer detection, scavenging, and other sampling biases. The larger the correction factors, the higher the uncertainty in the estimates.
- Fatality rates of birds vary among sites and likely depend on several factors including: the amount of bird use, vegetation, and other physical and biological characteristics of the specific wind plant and surrounding area.
- There have been no documented large fatality events of songbirds at wind projects.

ii. Indirect Impact
- Studies have demonstrated generally that there are two significant factors important in assessing risk to birds; the level of use at the site and the behavior of the birds at the site.
- Several studies have been published or are ongoing on the displacement and avoidance impacts of wind turbines and associated

infrastructure and activities on grassland and shrub-steppe breeding songbirds and other open country birds (prairie and sage grouse, shorebirds, waterfowl, etc.).

- Some other studies have documented decreased densities of and avoidance by grassland songbirds and other birds as a function of distance to wind turbines and roads. The level of impact varies by species, and ongoing research is quantifying the distance of avoidance caused by the presence of infrastructure and human activity. Some birds seem to adapt (habituate) to areas previously avoided.

Key wildlife habitats, migration corridors, staging/concentration area, and breeding/brood-rearing areas must be examined to help develop general siting strategies. Turbines must be situated so they do not interfere with important wildlife movement corridors and staging areas.

As indicated by experience at more recent projects, a pre-development site evaluation conducted at a potential wind site can help determine whether wind power development at that site is likely to cause avian and bat impacts at levels of concern. Such evaluations with respect to the site can include assessments of relevant existing information, physical inspections, and direct observational and technological methodologies designed to document levels of bird and bat use and behavior. One application of the site evaluation is for use in designing a less-impacting project.

In our proposed site, no obvious nesting areas for raptors were observed. Nesting birds, sharptail grouse, pheasants and ducks would be our main concern.

- **Endangered species of plants, animals and birds**

Careful consideration should be given to sites with the presence or potential presence of legally protected wildlife (state and federal). Declining or vulnerable species (not legally protected) must also be recognized. Wildlife issues and its apparent impacts on species of concern will be thoroughly investigated.

At this proposed site, we have contacted the US Fish and Wildlife Service and the South Dakota Department of Game, Fish and Parks for guidelines.

- **Natural Resources --**

i. Native Prairie Ground

- Large, intact areas of native vegetation should be avoided to minimize biological resource concerns.
- The US Fish and Wildlife Service requests roads to the turbines placed on native ground should be as short as possible. On the proposed site, the majority of the sections either have a highway, a gravel or dirt road on all four sides of the property. To be compliant with the USFWS guideline, the road to the turbine cannot be more than 3/8 mile.
- Prevent the introduction or establishment of non-native/invasive flora in disturbed areas.

- If a turbine is placed on native prairie ground, reclamation should include the following grasses : Big Blue Stem, Little Blue Stem, Side Oats Gamma.
- The construction of turbines on native ground should be done in the winter while the ground is frozen or during the time when soils are dry and the native vegetation are dormant.
- Although some native grassland does not have a USFWS grassland easement, all of the native grassland should be treated the same way.
- There are very few grassland easements in the total project site.

ii. Wetlands
- There are very few wetlands within the boundaries of this project site. The few areas of wetland can be avoided by visual siting and by using data from GPS and elevation readings.
- A joint siting evaluation will be conducted by US Fish and Wildlife staff and the developer.

iii. CRP (Conservation Reserve Program) acreages
- Before State and County Committees (COC) approves wind turbines, Farm Service Agency (FSA) shall complete an environmental review according to its guidelines. In the case of 3 or more turbines on a windfarm, it is an EA level of review.
- For this level of environmental review, FSA must pay careful attention to the potential effects of the wind turbines on migratory birds and threatened and endangered species. Other potential adverse impacts could include bird kills, vibrations, noise, and visual effects.
- To reduce the adverse effects of wind turbines on birds, the following mitigation measures should be considered:
    1. Do not locate turbines on wetlands or other known bird concentration areas, such as refuges, staging areas, or flyways.
    2. Turbines should not be located in areas with a very high incidence of fog, mist, and low ceilings.
    3. Cumulative impacts of multiple wind turbines must be clearly addressed.
- FSA shall include EA and all supporting documentation and consultation records as part of the producer's CRP file.

3. Noise

Noise emitted by wind turbines tends to be masked by the ambient (background) noise from the wind itself and tends to fall off sharply with increased distance, therefore noise-related concerns are likely to occur at residences closest to the site, particularly those sheltered from prevailing winds. Advanced turbine technology and preventive maintenance can help minimize noise during project operation.

- **Mitigations**

i. Upwind turbines
   - A wind turbine can be either "upwind" (that is, where the rotor faces into the wind) or "downwind" (where the rotor faces away from the wind). A downwind design tends to produce an "impulsive" or thumping sound that can be annoying. Today, almost all of the commercial wind machines on the market are upwind designs, and the few that are downwind have incorporated design features aimed at reducing impulsive noise (for example, positioning the rotor so that it is further away from the tower).

ii. Streamlining
   - Rounding or giving an aerodynamic shape to any protruding features and to the nacelle itself reduces any noise that is created by the wind passing the turbine. Turbines also incorporate design features to reduce vibration and any associated noise.

iii. Increased soundproofing in nacelles
   - The generator, gears, and other moving parts located in the turbine nacelle produce mechanical noise. Soundproofing and mounting equipment on sound-dampening buffer pads helps to deal with this issue.

iv. Efficient design of turbine blades
   - Turbine blades are constantly being redesigned to make them more efficient. The more efficient they are, the more the wind's energy is converted into rotational energy and the less aerodynamic noise is created.

v. Quiet gearboxes operation
   - Gear wheels in gearboxes are designed to flex slightly and reduce mechanical noise. In addition, special sound-dampening buffer pads separate the gearboxes from the nacelle frame to minimize the possibility that any vibrations could become sound.

4. Visual Resources

In areas where aesthetic qualities and/or neighboring properties might be affected, evaluation of siting impact on the quality of the surrounding landscape should be assessed.

➢ **Mitigations**

i. Educate all parties (landowners, the general public, and other key stakeholders)to alleviate FUD (Fear, Uncertainty and Doubts)
   - Tell them what to expect from a wind project.
   - Use visual simulations and/or viewshed analyses to provide information so that potential impacts to visual resources can be identified.

- Coordinate planning efforts in all jurisdictions and with all stakeholders.
- Prepare to make impact tradeoffs.

ii. Listen to the communities and stakeholders
- Be prepared to adapt design to minimize industrial characteristics and structures and minimize visual exposure from sensitive areas.

iii. Minimize developed roads or cut and fill techniques
- Consider possibilities and benefits of using roadless project designs or designs relying on current roads, especially in remote or sensitive visual areas.

iv. Identify designated scenic byways and popular landscapes
- Avoid siting turbines in areas that are readily visible from those sites. Priority should be given to wind power projects in sites where the natural landscape has already experienced significant change from human-related causes.

v. Use multiple locations
- Site fewer turbines in any one location and use larger and more efficient models to reduce the total number of turbines.

vi. Minimize intrusiveness
- One study finds that intrusiveness of a wind plant is not directly proportional to the number of turbines in an array, but instead, more a factor of design features. For example, large wind plants can be subdivided into several visually comprehensible units.

5. Public Interaction

Public involvement with each wind power project is deemed not just essential but critical. It is important that all stakeholders are informed of the benefits and tradeoffs associated with a wind project. It forms a foundation for all stakeholders to communicate and cooperative with each other in order to make informed decisions in the best interest of all parties. Accurate and comprehensive information enhance decision making by all stakeholders.

➢ **Plans**

i. Town meetings
- Hold towns meetings regularly to provide information and to provide a public forum for input from landowners and towns people.
- Encourage discussion of benefits and tradeoffs involved in wind generation to all parties.
- SummitWind will be holding an open house at Summit in the summer of 2007

ii. Provide access to objective information

- A web site will be provided for all interested parties to obtain accurate and comprehensive information such as progress, decisions, milestones etc. of the wind project.
- A SummitWind web site is currently being constructed.

6. Soil Erosion and/or Water Quality

Land disturbance resulting from construction and operation of energy generation facilities can remove vegetation and loosen soil particles, allowing them to be swept away by wind or water. This can accelerate the erosion process considerably if proper precautions are not taken, resulting in significant impacts (including both direct and indirect economic costs) both on and off the site.

Wind-induced erosion can increase fine particulate matter in the air which can adversely impact human health and reduce visibility. Water-induced erosion, in addition to removing soil and decreasing its productivity, results in sedimentation which degrades water quality, damages biological resources, exacerbates flooding, and accelerates filling of reservoirs.

Develop an area for energy generation facilities changes site and surrounding area runoff and drainage characteristics and may adversely impact resources on and off-site. Uncontrolled runoff from construction sites can cause short-term increases in turbidity and situation in nearby watercourses. Deposition of this sediment in nearby watercourses may adversely affect sensitive habitats, contribute to flooding, induce stream bank erosion, and alter downstream flow patterns. It is much less costly to prevent erosion in the beginning than to remove sediment from waterways and culverts.

- **Mitigations**

i. Minimize footprint of the project.
ii. Evaluate alternative turbine pad and access road siting and layouts.
iii. Minimize improved roads and construction staging areas and avoid sensitive habitats (e.g., native prairies and wetlands).
iv. Preferably conduct construction and maintenance of wind power sites when the ground is frozen or when soils are dry and the native vegetation is dormant.
v. Whenever possible, avoid road construction on steep slopes.
vi. A well-developed erosion and sediment control plan can reduce maintenance and replacement costs over the life of the project. It may also reduce regulatory delays in approving and monitoring the project.
vii. Certified weed-free seed of local ecotypes of native vegetation when reseeding disturbed areas and consider revegetation re-growth and cover.

7. Health and Safety

Unlike most other generation technologies, wind turbines do not use combustion to generate electricity, and hence don't produce air emissions. The only potentially toxic or hazardous materials are relatively small amounts of lubricating oils and hydraulic

and insulating fluids. Therefore, contamination of surface or ground water or soils is highly unlikely.

The primary health and safety considerations can be categorized into three areas – mechanical, interference with radar and telecommunication facilities, and electromagnetic fields (EMF).

- **Mechanical**
  This safety issue is related to blade movement and the presence of industrial equipment in areas potentially accessible to the public. It can be dealt with through adequate setbacks, security, safe work practices, and the implementation of a fire control plan.

  i. Safety setbacks
     - When evaluating specific parcels for development, safety setback distances from wind turbines and habitable dwellings, public highways, and property lines should be considered. Setbacks should provide adequate spacing from falling ice, blown turbine parts, and major structural failure.

  ii. Prevention and underground wiring
     - Design facilities and turbine pads to prevent or avoid public and worker safety problems. Consider the benefits of underground wiring between turbines and project substation.

- **Radar**
  Interference between wind facilities and radar is real; however, interference is a relative term and a good metric is the impact that interference has on a mission. Experience shows that only a small percentage of wind farms impact DOD's ability to perform a mission. At this time, DOD and FAA policies support a case-by-case assessment of projects.

  The most recent (September, 2006) FAA ruling on Radar and Wind Farms provides areas of 20-mile diameter as restricted areas for each state. There are buffer zones of variable sizes surrounding the restricted zones that are negotiable for wind farm developments.

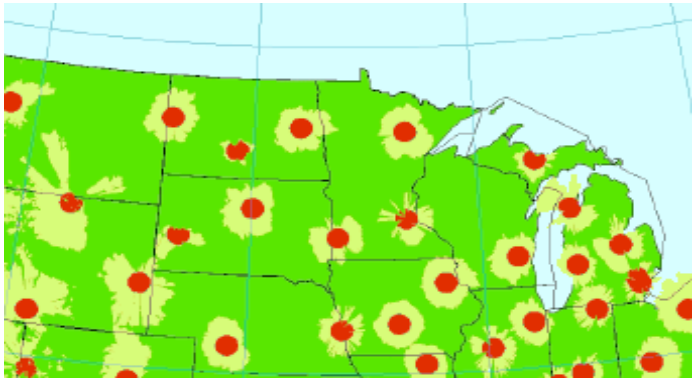

Figure 1 : Restricted areas and buffer zones (Source: Bruce Beard, National Operations Manager, FAA)

Other solutions :

i. Layout/Screening Solutions
   - Design the wind farm layout to be 'radar friendly'
   - Turbine spacing, topology, turbine structure design, RCS management, etc
   - Screen the wind farm from the radar

ii. Radar Solutions
   - Adjust the radar settings to optimize performance
   - Modify the radar processing design
   - Add extra filtering to the radar (ADT plot filter)
   - Reinforce radar cover from existing or new sensor

iii. Turbine Solutions
   - Materials - QinetiQ of United Kingdom has developed a non-conventional Radar-Absorbing Material (RAM) solution which, unlike conventional parasitic RAM, can be incorporated into the turbine blade structure. It was achieved by replacing one of the composite's glass cloth layers with a specially modified version, enabling thin (relative to wavelengths being absorbed) composites to absorb more than 99% of incidental radar.

- **Electromagnetic Fields**

The public is routinely exposed to Electromagnetic Fields (EMF) emanate from any wire carrying electricity in their everyday lives. Typically, electrical cabling between wind turbines is buried in the ground, effectively eliminating any EMF. Grid connection is usually made at no more than 132kV, similar to the voltages used by utilities in existing distribution networks. In the SummitWind project, the interconnection is designed at 230 kV.

From a wind resource perspective, high and exposed sites are attractive. So it is not unusual for any of a range of telecommunications installations; radio and television masts, mobile phone base stations or emergency service radio masts, to be located nearby.

Care must be taken to ensure that wind turbines do not passively interfere with these facilities by directly obstructing, reflecting or refracting the RF EMR signals from these facilities. There is also potential for a wind turbine to actively interfere by producing its own low energy RF signal.
The impact of wind turbine generators on electromagnetic waves is relatively minor and means of mitigation, avoidance or remedy can be found for all potential impacts. Any interference can be minimized or eliminated through a combination of appropriate turbine siting and special technical solutions.

i. Point to Point Communications
   - Careful siting and directional antennae can eliminate any impact on point to point links.

ii. Mobile Radio Services

- Interference can be overcome by moving the mobile unit a short distance away as per normal practice for avoiding any other structure. Any interference to mobile radio services is usually negligible and limited to mobile communications within the wind farm site itself.

iii. Television

- Interference to television signals in the wind farm area can be caused by either the reflection or obstruction of the signal by the turbine blades. With glass reinforced plastic blades, modern wind turbine generators will cause minimal television interference. It cannot however, be completely discounted for houses within a few kilometers of turbines. If interference does become apparent after construction, the possible mitigation techniques include:

    - Install a better quality antenna or more directional antenna
    - Direct the antenna toward an alternative broadcast transmitter
    - Install a more powerful amplifier
    - Relocate the antennae to achieve better signal to noise ratio
    - Acquire digital, satellite or cable TV if possible

➢ **Emissions, solid and liquid wastes, toxic and hazardous materials**

Wind farms differ substantially from most other electrical facilities in that they do not use a combustion process to generate electricity and hence do not produce any air pollutant emissions. In addition, the only potentially toxic or hazardous materials associated with most wind farms are relatively small amounts of lubricating oils, and hydraulic and insulating fluids. (However, bear in mind that even small leakages of such materials can have ground water or habitat impacts if left unchecked over time

(See Section 10 Solid and Hazardous Wastes.)

8. Cultural, Archaeological, and Paleontological Resources

During project design and site development, important cultural and fossil resource sites, historic landmarks and geographical prominence should be avoided and protected or else a mitigation plan should be developed. Special care should be taken to preserve the confidentiality as well as the integrity of certain sensitive resources or sites sacred to Native Americans.

A good share of the land in the proposed site is located on land which is the Sisseton-Whapeton Indian Reservation ground. The land has been primarily deeded to local farmers but still needs research on native artifacts, burial grounds, sites of ancient habitation and other pertinent resources. Any artifacts on current CRP land or farmground would mainly be below plow line, a record search for these artifacts is recommended. Our initial consultation with landowners revealed no such findings. However, consultation with the South Dakota State Historical Society and other qualified professional specialists familiar with cultural and fossil resources in the

project development area is highly recommended. Also, approval is needed from the State Historic Preservation and Tribal Historic Preservation offices.

9. Economic, Socioeconomic, Public Service, and Infrastructure

- **Economic Impacts**

Wind energy project, like any business development will have both **direct** and **indirect** economic impacts on the local and regional economies. A new wind project directly affects an area through the purchase of goods and services, generation of land use revenue, taxes or payments in lieu of taxes, and employment. Secondary or indirect economic effects may include increased spending power, economic diversification, changes in property values and the use of indigenous resources.

Typically, these impacts that affect the host community are either viewed as a benefit or a drawback. It depends a good deal on the perspective of the viewer.

- **Direct Economic Impacts**

Direct economic effects from the development of a wind project include land owner revenue, revenues to local governments from property or other taxes, the creation of jobs, and the use of local services.

i. Land Owner Revenue
   - Wind project provides an additional source of income to rural land owners from leasing and royalty agreements.
   - It diversifies landowner's income since wind turbine(s) utilizes only a fraction of the land, previous uses (ranching or farming) continue alongside the wind power facility.
   - Annual landowner easement payments are typically $2,000 – $5,000 per MW of installed capacity.

ii. Property Taxes
   - In many locations, wind projects can be among the highest paying property tax entities. The largest beneficiaries of the added revenue will be the towns and schools.
   - $500,000 - $1,000,000 in new annual property tax payments are generated for every 100 MW of installed capacity.

iii. Job Creation
   - Wind energy projects create jobs. In general, the employment opportunities associated with a wind power plant are in construction, operations and maintenance (O&M), and manufacturing. Various studies have shown that, compared to conventional generation options, wind development creates more jobs per dollar invested and per kWh generated.
   - 40 to 140 jobs are created during the construction phase for

every 100MW of installed capacity; 6 to 10 new jobs are created during the operations phase for every 100 MW of installed capacity.

iv. Use of local services
- Wind projects are usually staffed with primarily local personnel, with an experienced supervisor or facility manager supporting the locally hired employees. The number of local employees hired will depend on available skills and training.

➢ **Indirect Economic Impacts**

i. During the construction and operation phase of a wind project, purchase of local goods and services constitutes indirect economic impacts of the local community.

- Construction materials and equipment
- Maintenance tools
- Supplies
- Equipment and manpower essentials
  - Food, clothing, safety equipment etc.
- Support services
  - Accounting, banking and legal assistance

ii. Secondary impact
- Referred to as the induced effect - additional household earnings from employment growth results in increased household spending on goods and services.

10. Solid and Hazardous Wastes

A wind project may be spread out over a wide area, and consist of several individual sites. Waste materials will be generated during construction as well as operation of the wind farm.

➢ **Source of wastes**

i. Fluid leaks
- Gearbox oils, hydraulic and insulating fluids from not well-designed and maintained turbines. Dripped fluids and those flying off the tips of the blades can contaminate the ground below.

ii. On-site storage
- On-site storage of new and used lubricants and cleaning fluids also constitutes a hazard.

- **Mitigations**

    i. Fluid leaks and On-site storage

        - Ensure that construction wastes are collected from all sites and disposed of at a licensed facility.
        - During operation, waste production may be concentrated at service facilities and control centers, except when units are being serviced.
        - Waste disposal practices should not be different from those required at other power plants or repair facilities.
        - Anticipate and avoid use of hazardous fluids.
        - When use of hazardous materials cannot be avoided a Hazardous Materials Management Plan should be drawn up to address avoidance, handling, disposal, and cleanup.
        - Turbine maintenance facilities and major turbine repairs can be done off-site. Some permits have banned on-site repairs of construction and maintenance vehicles.

11. Air Quality and Climate

Wind generation is a non-combustion process relying on the direct conversion of mechanical energy into electrical energy. Thus unlike conventional fossil-fired electric power plants there are no emissions from the generation process. Indeed, to the extent that energy from wind farms displaces electricity from fossil fuels, pollutant emissions in other areas are reduced. Similarly, to the extent that energy from wind farms displaces existing or additional electricity from fossil fuels, greenhouse gas emissions and the prospect of resulting global climate change impacts are reduced. The extent of such pollutant and greenhouse gas emissions displacement can be calculated using the average emissions of the fuel mix from which the utility or other customer purchasing the wind-generated electricity normally obtains its electricity supply.

Federal, state, and local air quality plans are concerned with particulate matter less than 10 microns in diameter, known as PM10. Production of particulate matter is the only air quality impact likely to occur in conjunction with a wind farm, and is primarily associated with construction activities. These pollutants will be largely confined to the project area. No negative long-term air quality impacts are likely to occur.

12. Grant and Roberts county planning and zoning requirements

One of the key stakeholders associated with economic development is local government. Its officials often need to make important decisions concerning wind energy projects. They must evaluate and vote on project permits, determine and articulate wind energy benefits that accrue to their county.

County officials have therefore created requirements and regulations pertaining to energy system permits.

The footprint of the SummitWind project spans across Grant and Roberts County in South Dakota. The following guidelines are based on the Grant County Planning and Zoning Commission Document (Section 1211) "Energy System (Wes) Requirements". It is provided with the assumption that Roberts County has the similar requirements.

Section 1211. Energy System (Wes) Requirements

Section 1211. 01 Applicability

The requirements of these regulations shall apply to all WES facilities except private facilities with a single tower height of less than seventy-five (75) feet and used primarily for on-site consumption of power.

Section 1211.02 Federal and State Requirements

All WESs shall meet or exceed standards and regulations of the Federal Aviation Administration and South Dakota State Statutes and any other agency of federal or state government with the authority to regulate WESs.

Section 1211.03 General Provisions

1. Mitigation Measures

    i. Site Clearance - the permittees shall disturb or clear the site only to the extent necessary to assure suitable access for construction, safe operation and maintenance of the WES.

    ii. Topsoil Protection - the permittees shall implement measures to protect and segregate topsoil from subsoil in cultivated lands unless otherwise negotiated with the affected landowner.

    iii. Compaction - the permittees shall implement measures to minimize compaction of all lands during all phases of the project's life and shall confine compaction to as small as area as practicable.

    iv. Livestock Protection - the permittees shall take precautions to protect livestock during all phases of the project's life.

    v. Fences - the permittees shall promptly replace or repair all fences and gates removed or damaged during all phases of the project's life unless otherwise negotiated with the affected landowner.

    vi. Roads
    - Public Roads – prior to commencement of construction, the permittees shall identify all state, county or township governing body having jurisdiction over the roads to determine if the haul roads identified are acceptable. The governmental body shall b e given adequate time to inspect the haul roads prior to use of these haul roads. Where practical, existing roadways shall be used for all

activities associated with the WES. Where practical, all-weather roads shall be used to deliver cement, turbines, towers, assembled nacelles and all other heavy components to and from the turbine sites.

- The permittees shall, prior to the use of approved haul roads, make satisfactory arrangements with the appropriate state, county or township governmental body having jurisdiction over approved haul roads for construction of the WES for the maintenance and repair of the haul roads that will be subject to extra wear and tear due to transportation of equipment and WES components. The permittees shall notify the County of such arrangement upon request of the County.

- Turbine Access roads – construction of turbine access roads shall be minimized. Access roads shall be low profile roads so that farming equipment can cross them and shall be covered with Class 5 gravel or similar material. When access roads are constructed across streams and drainage ways, the access roads shall be designed in a manner so runoff from the upper portions of the watershed can readily flow to the lower portion of the watershed.

- Private Roads – the permittees shall promptly repair private roads or lanes damaged when moving equipment or when obtaining access to the site, unless otherwise negotiated with the affected landowner.

- Control of Dust – the permittees shall utilize all reasonable measures and practices of construction to control dust.

- Soil Erosion and Sediment Control Plan – the permittees shall develop a Soil Erosion and Sediment Control Plan prior to construction and submit the plan to the county. The Soil Erosion and Sediment Control Plan shall address the erosion control measures for each project phase, and shall at a minimum identify plans for grading, construction and drainage of roads and turbine pads; necessary soil information; de5tailed designed features to maintain downstream water quality; a comprehensive revegetation plan to maintain and ensure adequate erosion control and slop stability and to restore the site after temporary project activities; and measures to minimize the area of surface disturbance. Other practices shall include containing excavated material, protecting expos3d soil, stabilizing restored material and removal of silt fences or barriers when the area is stabilized. The plan shall identify methods for disposal or storage of excavated material.

2. Setbacks

Wind turbines shall meet the following minimum spacing requirements.

i. Distance from existing off-site residences, business and public buildings shall be one thousand (1,000) feet. Distance from on-site or lessor's residence shall be five hundred (500) feet.

ii. Distance from public right-of-way shall be two (2) times the height of the wind turbines, measured from the ground surface to the tip of the blade when in a fully vertical position.

iii. Distance from any property line shall be two (2) times the height of the wind turbine, measured from the ground surface to the tip of the blade when in a fully vertical position unless wind easement have been obtained from adjoining property owner.

3. Electromagnetic Interference

The permittees shall not operate the WES so as to cause microwave, television, radio or navigation interference contrary to Federal Communications Commission (FCC) regulations or other law. In the event such interference is caused by the WES or its operation, the permittes shall take the measures necessary to correct the problem.

4. Lighting

Towers shall be marked as required by the Federal Aviation Administration (FAA). There shall be no lights on the towers other than what is required by the FAA. This restriction shall not apply to infrared heating devices used to protect the monitoring equipment. Upon commencement of construction of a Tower, in cases where there are residential uses located within a distance which is three hundred (300) percent of the height of the Tower from the Tower and when required by federal law, dual mode lighting shall be requested from the FAA. Beacon lighting, unless required by FAA, shall not be utilized.

5. Turbine spacing

The turbines shall be spaced no closer than three (3) rotor diameters (RD) within a string and 10 RDs between strings. If required during final micro siting of the turbines to account for topographic conditions, up to 10 percent of the towers may be sited closer than the above spacing but the permittees shall minimize the need to site the turbines closer.

6. Footprint Minimization

The permittees shall design and construct the WES so as to minimize the amount of land that is impacted by the WES. Associated facilities in the vicinity of turbines such as electrical/electronic boxes, transformers and monitoring system shall to the greatest extent feasible be mounted on the foundations use for turbine towers or inside the towers unless otherwise negotiated with the affected landowner.

7. Electrical Cables

   The permittees shall place electrical lines, known as collectors, and communication cables underground when located on private property. Collectors and cable shall also be placed within or immediately adjacent tot the land necessary for turbine access roads unless otherwise negotiated with the affected landowner. This paragraph does not apply to feeder lines.

8. Feeder lines

   The permittees shall place overhead electric lines, known as feeders, on public rights-of-way if a public right-of-way exists. Changes in routes may be made as long as feeders remain on public rights-of-way and approval has been obtained from the governmental unit responsible for the affected right-of-way. If no public right-of-way exists, the permittees may place feeders on private property. When placing feeders on private property, the permittees shall place the feeder in accordance with the easement negotiated with the affect3d landowner. The permittees shall submit the site plan and engineering drawing for the feeder lines before commencing construction.

9. Decommissioning/Restoration/Abandonment

   i. Decommissioning Plan - within 120 days of completion of construction, the permittees shall submit to the County a decommissioning plan. The plan should describe the manner in which the permittees anticipate decommissioning the project in accordance with the requirements of paragraph (ii) below. The plan shall include a description of the manner in which the permittees will ensure that it has the financial capability to carry out these restoration requirements when they go into effect. The permittees shall ensure that it carries out its obligation to provide for the resources necessary to fulfill these requirements. The County may at any time request the permittees to file a report with the County describing how the permittees are fulfilling this obligation.

   ii. Site Restoration – Upon expiration of this permit, or upon earlier termination of operation of the WES, the permittees shall have the obligation to dismantle and remove from the site all towers, turbine generators, transformers, overhead and underground cables, foundations, buildings and ancillary equipment to a depth of four feet. To the extent possible the permittees shall restore and reclaim the site to its pre-project topography and topsoil quality. All access roads shall be removed unless written approval is given by the affected landowner requesting that one or more roads, or portions thereof, be retained. Any agreements for removal to a lesser depth or for no removal shall be recorded with the County and shall show the locations of all such foundations. All such agreements between the permittees and the affected landowner shall be submitted to the County prior to completion of restoration activities. The site shall be restored in accordance with the requirements of this condition within eighteen (18) months after expiration.

10. Abandoned Turbines

    The permittees shall advise the County of any turbines that are abandoned prior to termination of operation of the WES. The County may require the permittees to decommission any abandoned turbine.

11. Height from Ground Surface

    The minimum height of blade tips, measured from ground surface when a blade is in fully vertical position, shall be twenty-five (25) feet.

12. Towers

    i. Color and Finish – the finish of the exterior surface shall be non-reflective and non-glass.

    ii. All towers shall be singular tubular design.

13. Noise

    Noise level shall not exceed 50 dBA, including constructive interference effects at the property line of existing off-site residences, businesses and public buildings.

14. Permit Expiration

    The permit shall become void if no substantial construction has been completed within two (2) years of issuance.

15. Required Information for Permit

    i. Boundaries of the site proposed for WES and associated facilities on United States Geological Survey Map or other map as appropriate.
    ii. Map of easements for WES
    iii. Copy of easement agreements with landowners
    iv. Map of occupied residential structures, businesses and public buildings
    v. Map of sites for WES, access roads and utility lines
    vi. Proof of utility right-of-way easement for access to transmission lines
    vii. Location of other WES in general area
    viii. Project schedule

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